

CLAIMS:

We claim:

1. A vertebral body replacement comprising:
a body with a top, a bottom, an anterior face, a posterior face, and two growth hole faces, including at least one planar face;
at least one window-shaped passage passing through the body;
wherein the top and the bottom include a plurality of serrations;
wherein at least one hole is provided that extends through the two growth hole faces; and
wherein the top and the bottom each include at least one groove that extends parallel to the planar face.
2. The vertebral body replacement of claim 1, wherein the at least one groove includes at least one continuous groove that extends through a full portion of the top and of the bottom.
3. The vertebral body replacement of claim 1, wherein the at least one groove includes at least one discontinuous groove that extends through a partial portion of the top and of the bottom.

4. The vertebral body replacement of claim 1, wherein the at least one groove is capable of being received by an installation tool for insertion into an intervertebral space.
5. The vertebral body replacement of claim 1, wherein one of the two growth hole faces is arcuate.
6. The vertebral body replacement of claim 5, wherein the arcuate face has a curved shape that acts as an integral protrusion to provide stability.
7. The vertebral body replacement of claim 1, further comprising a second vertebral body replacement identical in construction to the vertebral body replacement and wherein the vertebral body replacement and the second vertebral body replacement are capable of being inserted adjacent one another into an intervertebral space.

8. The vertebral body replacement of claim 7, wherein said second vertebral body replacement includes two second growth hole faces, with at least one being a second planar face, and wherein the second planar face is oriented parallel to said planar face of said vertebral body replacement when the vertebral body replacement and second vertebral body replacement are inserted adjacent one another in the vertebral space.
9. The vertebral body replacement of claim 1, wherein the two growth hole faces include four spaced holes.
10. The vertebral body replacement of claim 1, wherein the anterior face is formed as a rounded portion that facilitates minimally invasive insertion of the vertebral body replacement.

11. A method of inserting vertebral body replacements comprising:
providing a first vertebral body replacement having a body with a top, a bottom, an anterior face, a posterior face, and two growth hole faces, including at least one first planar face; at least one window-shaped passage passing through the body; wherein the top and the bottom include a plurality of serrations; wherein at least one hole is provided that extends through the two growth hole faces; and wherein the top and the bottom each include at least one groove that extends parallel to the planar face;
providing a second vertebral body replacement having a second body with a second top, a second bottom, a second anterior face, a second posterior face, and two second growth hole faces, including at least one second planar face; at least one window-shaped passage passing through the second vertebral body replacement; wherein the second top and the second bottom include a plurality of serrations; wherein at least one hole is provided that extends through the two growth hole faces; and wherein the second top and the second bottom each include at least one groove that extends through the plurality of serrations in the second body;
inserting the first vertebral body replacement into an intervertebral space with an insertion tool; and
inserting the second vertebral body replacement into the intervertebral space with the insertion tool, wherein the first vertebral body replacement and the second vertebral body replacement are adjacent with the first planar face and the second planar face oriented parallel to and in near contact of one another.

12. The method of claim 11, wherein the insertion tool is received in the first insertion groove of the first vertebral body replacement during the first inserting step and in the second insertion groove of the second vertebral body replacement during the second inserting step.
13. The method of claim 11, wherein the method further comprises:
filling the at least one window-shaped passage of the first vertebral body replacement and of the second vertebral body replacement with bone tissue.
14. A vertebral body replacement comprising:
 - (a) a body having an upper surface and a lower surface, an anterior face and a posterior face, the anterior face and the posterior face extending from the lower surface to the upper surface; and
 - (b) a first guiding groove in the upper surface and a second guiding groove in the lower surface.
15. The vertebral body replacement of Claim 14, wherein the upper surface is non-parallel to the lower surface.
16. The vertebral body replacement of Claim 14, wherein the body has a rectangular cross-section.

17. The vertebral body replacement of Claim 14, wherein the body has at least one protrusion capable of contacting a vertebra.
18. The vertebral body replacement of Claim 14, wherein the body has at least one protrusion on each of the upper surface and lower surface thereof.
19. The vertebral body replacement of Claim 14, wherein the body further comprises at least one bore capable of receiving bone tissue.
20. The vertebral body replacement of Claim 14, wherein the body is composed of a biocompatible material selected from the group consisting of a biocompatible polymer, a metal, a bone material, or a combination thereof.
21. The vertebral body replacement of Claim 14, wherein the body is a section from the shaft of a femur and comprises a portion of the femur medullary cavity.
22. The vertebral body replacement of Claim 14, wherein the body further comprises a metallic sheath.
23. The vertebral body replacement of Claim 22, wherein the metallic sheath further comprises a plurality of protrusions thereon, and wherein the protrusions are capable of contacting a vertebra.
24. The vertebral body replacement of Claim 14, wherein the body further comprises at least one upper slot extending inwardly from the upper surface and at least one lower slot extending inwardly from the lower surface.

25. The vertebral body replacement of Claim 24, wherein the at least one slot has a bone core therein.
26. The vertebral body replacement of Claim 14, wherein the body comprises a plurality of bonded layers.
27. The vertebral body replacement of Claim 26, wherein at least one bonded layer comprises a bone core.
28. The vertebral body replacement of Claim 27, wherein the bonded layers are bonded by an adhesive.
29. The vertebral body replacement of Claim 27, and further comprising at least one linking pin for bonding.
30. The vertebral body replacement of Claim 27, and further comprising the linking pins for bonding.
31. A system for delivering a vertebral body replacement comprising:
 - (a) an insertion tool including a channel capable of receiving, in a slideably disposable manner, a pusher and a vertebral body replacement; and
 - (b) a cutting tool having a shaft, with a distal end and a proximal end, and a cutting head secured to the distal end of the shaft, wherein the cutting tool is capable of being slideably disposable in the insertion tool.

32. The system of Claim 31, further comprising a guiding tool configured to slideably engage the channel of the insertion tool.
33. The system of Claim 31, wherein the insertion tool has a body replacement guide slideably engaging the vertebral body replacement.
34. The system of Claim 33, wherein the body replacement guide is at least one flange disposed on the channel of the insertion tool.
35. The system of Claim 33, wherein the body replacement guide is at least one rib longitudinally disposed on the inner surface of the channel of the insertion tool.
36. The system of Claim 33, wherein the body replacement guide is a protrusion on an inner surface of the channel of the insertion tool.
37. The system of Claim 33, wherein the body replacement guide comprises a plurality of protrusions on the inner surface of the channel of the insertion tool.
38. The system of Claim 31, wherein the distal end of the pusher is configured to receive the vertebral body replacement.
39. The system of Claim 31, wherein the cutting tool further comprises a striking head connected to the proximal end of the shaft.
40. The system of Claim 31, wherein the cutting tool further comprises an attachment member for securing the cutting head to the distal end of the shaft.

41. A method for delivering a vertebral body replacement, the method comprising:
 - (a) inserting an insertion tool into an intervertebral space;
 - (b) engaging at least a first guiding groove of a vertebral body replacement with a space guide of the insertion tool; and,
 - (c) inserting the vertebral body replacement into the intervertebral space into a vertebral body replacement receiving slot in the intervertebral space.
42. The method of Claim 41, wherein the insertion tool is rotated into a position substantially normal to a vertebra.
43. The method of Claim 41, and further comprising:
 - (a) inserting a guide tool into a selected position in the intervertebral space;
 - (b) sliding the insertion tool along the guide tool;
 - (c) directing the insertion tool to the selected position in the intervertebral space;
and
 - (d) removing the guide tool from the insertion tool.
44. The method of Claim 41, further comprising the steps of:
 - (a) sliding a cutting tool into the insertion tool;
 - (b) contacting the vertebra with the cutting tool;
 - (c) cutting the vertebral body replacement receiving slot in the intervertebral space;
 - (d) removing the cutting tool; and
 - (e) inserting the vertebral body replacement into the vertebral body replacement receiving slot.

45. The method of Claim 44, further comprising the method to deliver a second vertebral body replacement to the intervertebral space.
46. A kit for delivering a vertebral body replacement to the spinal column of a patient comprising:
 - (a) an insertion tool comprising a channel having an inner surface;
 - (b) a pusher having a distal end;
 - (c) a vertebral body replacement capable of being slideably disposed along the channel of the insertion tool; and,
 - (d) a cutting tool having a shaft with a distal end and a proximal end, and a cutting head secured to the distal end of the shaft, wherein the cutting tool is capable of being slideably disposed along the insertion tool.
47. The kit of Claim 46, further comprising a guiding tool configured to slideably engage the channel of the insertion device.